

Application No. 09/964,242
Amendment Dated February 3, 2004
Reply to Office Action dated October 30, 2003

REMARKS

By this Amendment, the specification is amended, Claims 1-31 and 43-57 are canceled without prejudice, Claims 32, 35 and 36 are amended. Claims 1-31 and 43-57 have been cancelled pursuant to a restriction requirement. Claims 32-42 are pending.

Enclosed herewith as Exhibit A is a certified copy of the priority document, namely, British Patent Application 0120588.9.

The Examiner has objected to the drawings under 37 CFR §1.83(a) and, in particular, cites the “opacity monitor,” “reflector” and “analyzer” in Claim 32 as not being shown in the drawings. However, Figs. 1 and 2 depict these features. As stated in the Specification¹, the opacity monitor of Figs. 1 and 2 is similar in all aspects to the present invention except for the light source 100. Thus, the opacity monitor (e.g., Model 4500mkll) of the present invention is shown at 20 (transceiver) and 24 (reflector) wherein the analyzer A (see Fig. 2) forms a portion of the transceiver 20. Thus, Applicants respectfully submit that the opacity monitor, the reflector and the analyzer are depicted in the figures of the present application and therefore respectfully request that the objection to the drawings be withdrawn.

¹It should be understood that the light source 100 described herein, and as will be discussed in detail below, replaces the light source LS (e.g., LED 32) described earlier with respect to Figs. 1-2. However, in all other aspects, e.g., the beamsplitter 34, the collimating lens 36, etc., of the transceiver portion 20 of the transmissometer which utilizes the present invention 100 is similar and is not discussed any further. (Emphasis added, Present application, page 8 lines 21-23 to page 9, lines 1-2).

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The Examiner objected to Claims 32 and 35 with regard to the inadvertent errors in the language of those claims. To that end, Applicants have amended the claims accordingly and respectfully request that the objection to those claims be withdrawn.

The Examiner has objected to Claim 32 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,476,911 (Rose). In particular, the Examiner asserts that:

With regard to claim 32, Rose discloses an opacity monitor for measuring the opacity of gases in an open path of gases, said opacity being defined as the fraction of transmitted light which is lost in transmission through the open path of gases, said opacity monitor comprising:

an optical transmitter having a light source that projects a homogeneous (light-emitting diode 38) light beam across the open path of gases (see path between smokestack 14 and wall W) (see Fig. 1);

a reflector (wall W) for reflecting a portion of said projected homogeneous light beam back towards said optical transmitter through said open path of gases (see Fig. 1);

an analyzer (photodetector 48) for detecting said portion of said projected homogeneous light beam and calculating the opacity of said gases (see Col. 1, lines 21-9); and

wherein said opacity monitor detects opacities less than 10 percent while operating within specific performance requirements (see Col. 1, lines 21-9, Col. 2, lines 21-8, Col. 8, lines 50-67).

Applicants respectfully disagree for the following reasons.

Rose describes a backscatter dust monitor, not an opacity meter. Rose does not claim to measure opacity - his invention measures very low concentrations of dust, whose opacity is less than 5%. The Rose device actually measures the amount of light scattered by the dust. Dust concentration is related to opacity through the Beer-Lambert law, but the two quantities are distinct. Furthermore, the Rose device does not comprise "a reflector (wall W) for reflecting a portion of said homogeneous

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light beam" as specified in Claim 1 of the present invention. In fact, Rose actually teaches away from that:

As discussed in more detail below, the angular orientation of monitor 10 assists in projecting the radiant beam into the stack at a projection angle that minimizes the reflection of radiant energy from the opposite stack wall W back to the monitor. (emphasis added, Rose, col. 3, line 67 to col. 4, line 5).

In contrast, as stated on page 3 of the present invention, "...the transmissometer is autocollimated meaning that the return light from the retroreflector 24 is along the same path as the projected beam 26." (Present application, p. 3, lines 7-9). Claim 32 has been amended to more clearly specify this distinction.

Secondly, the source of light used in Rose is an infrared light emitting diode (IRED)² which does not meet the requirements of ASTM D-6216³ because that standard requires the use of visible light. Moreover, an IRED produces an inhomogeneous beam of light into the stack. As mentioned earlier, since the Rose device uses back-scattering, there is no need to require the use of a homogeneous beam of light and, as such, the issue of even having to use a homogeneous beam of light is not a problem that needs to be solved by Rose. Thus, Rose also fails to disclose a light source that projects a homogeneous light beam.

²Rose, col. 4, lines 15-18.

³The standard forms the Appendix of the Present Application and is entitled "Standard Practice for Opacity Monitor Manufacturers to Certify Conformance with Design and Performance Specifications."

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For all of these reasons, Applicants respectfully submit that Claim 32 as amended distinguishes over the art of record and requests that the §102(e) rejection be withdrawn.

The Examiner has rejected Claims 33-35 under 35 U.S.C. §103(a) as being unpatentable over Rose as applied to Claim 32 and further in view of U.S. Patent No. 6,404,984 (Parvulescu et al.) and U.S. Patent No. 5,617,212 (Stuart). In particular, the Examiner states that:

With regard to claim 33, Rose does not teach the opacity monitor of Claim 32 wherein said light source comprises a plurality of light emitting diodes (LEDs). Instead, Rose teaches the light source to comprise only one light emitting diode (see Fig. 1). However, Parvulescu et al. teach a light source comprising a plurality of light emitting diodes (diodes 103) arranged at a predetermined angular orientation with respect to each other and emitting respective light beams therefrom (see Fig. 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to replace the light source of Rose with the light source of Parvulescu for increasing illumination.

With regard to claim 33, Rose also does not teach the opacity monitor of Claim 32 wherein said light source comprises an optical diffuser. However, Stuart teaches a light source (see LED 1) comprising an optical diffuser (diffuser 2) positioned at a predetermined distance from the light source to form a homogeneous light beam (see Fig. 2). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to add to the light source of Rose the diffuser of Stuart for increasing illumination uniformity.

With regard to claim 34, Parvulescu et al. teach the light source discussed above with respect to claim 33 wherein said plurality of LEDs comprises more than three LEDs, i.e., eight LEDs (see Fig. 1). However, the omission of an element and its function in a combination where the remaining elements perform the same functions as before involves only routine skill in the art. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to omit five of the eight LEDs of Parvulescu to reduce illumination to a desired level, i.e., the level of illumination provided by three LEDs.

With regard to claim 35, Parvulescu et al. teach an arrangement in which the eight LEDs discussed above with respect to claim 34 are oriented 45 degrees with respect to each other; that is, the LEDs are oriented symmetrically about the center of a circle (see Fig. 1). Therefore, the case in which three LEDs are used requires the arrangement in which the LEDs are oriented 120 degrees with respect to each other.

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Applicant respectfully disagrees for the following reasons.

Claims 33-35 ultimately depend from Claim 32 and are patentable for the same reasons. In addition, Parvulescu describes a form of ring-light. This is a common form of illumination which photographers use to reduce the effects of harsh shadows in their photographs. In its traditional form, the ring light consists of a circular flash tube which mounts around the main lens of a camera. Parvulescu's invention replaces the flash tube with a set of 8 LEDs, but it is primarily a way for illuminating the subject and the light source mounts around the lens. He makes no claim for a high degree of homogeneity. In addition, Rose specifies that the light source used therein emits at an angle of projection A₂ "preferably in the range from about 5° to 20°, with an angle of about 10° to 15° having been found suitable⁴." Contrary to the Examiner's assertion that the Rose light source can be substituted with the Parvulescu's light source, it is questionable whether the angle of projection specified in Rose can be achieved by the Parvulescu's light source, nor does such a replacement even address Rose's use of infrared light, as opposed to Parvulescu's white diodes⁵. Furthermore, the large central aperture in Parvulescu's light source would make it extremely difficult to produce a

⁴Rose, col. 4, lines 21-23.

⁵The motivation for even combining Rose with Parvelescu is questionable. The thrust of Parvelescu is to provide a self-contained camera that supplies ample power both to the camera and a light source that provides sufficient lighting for a dental work area. Why would replacing the IRED light source of Rose with the light source arrangement of Parvelescu be beneficial? The only reason to combine Rose with Parvelescu would be to use the present application as a template. Applicants remind the Examiner that the mere fact that the references cited may be modified or even combinable does not allow the PTO to meet its burden absent a suggestion in the cited art of the desirability of the modification or combination. Moreover, the PTO may not "use the claimed invention as an instruction manual or 'template' to piece together the teachings of the prior art so that the claimed invention is rendered obvious." In re Fritch, 23 U.S.P.Q.2d 1780 (Fed. Cir. 1992).

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homogeneous light source by adding a diffuser (Stuart). There would almost certainly be a dark center to the illuminated area, precisely the problem which the present invention seeks to correct. In addition, it is not obvious that Parvulescu's invention could be rearranged so that the lens could be used to produce a collimated beam from the light source. Finally, the goal of the invention of Claim 33 is not to "increase illumination"⁶ but to form a homogeneous light beam. Thus, for all of these reasons, Applicants respectfully submit that even if one skilled in the art were to combine Rose with Parvulescu and Stuart⁷, the result would still not yield the inventions specified in Claims 33-35. Thus, Applicants submit that Claims 33-35 are patentable over the art of record and respectfully request that the §103(a) rejection be withdrawn.

The Examiner has rejected Claims 36-37 also under 35 U.S.C. §103(a) as being unpatentable over Rose in view of Parvulescu and Stuart as applied to claim 35 and further in view of U.S. Patent No. 6,558,021 (Wu et al.). In particular, the Examiner states that:

With regard to claim 36, Parvulescu et al. are silent as to a means for mounting the LEDs discussed above with respect to claim 35. However, Wu et al. disclose a light source comprising a plurality of LEDs (LEDs 18) wherein each of said LEDs comprises a pair of leads (see Col. 3, lines 62-4) and wherein said light source further comprises:
an LED holder (surface 20) having holes (see Col. 3, lines 62-4,
Fig. 1A);
a clamp member (housing 12) having holes for each one of said
leads (see Col. 3, lines 62-4, Fig. 1A);

⁶The Examiner cites this as the reason for that one skilled in the art would combine Rose with Parvulescu.

⁷Applicants also assert that one skilled in the art would not even combine these references for the reasons stated earlier.

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wherein said LED holder and said clamp member couple together to maintain said LEDs in a predetermined orientation (see Fig. 1A).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the mounting means of Wu et al. for mounting the LEDs of Parvulescu et al. for maintaining said LEDs in a predetermined orientation.

With regard to claim 37, Wu et al. teach each of said LEDs discussed above with respect to claim 36 to comprise a flattened portion (sides of the LEDs) and wherein said clamp member is arranged to orient the flattened portion of each of said LEDs towards each other (see Fig. 1A).

Applicants respectfully disagree for the following reasons.

Claims 36-37 ultimately depend from Claim 32 and are patentable for the same reasons. In addition, Wu describes a light source involving a plurality of LEDs. However, the LEDs in question are mounted roughly parallel to one another, not at a prescribed angle, and there is no mention of a method for ensuring precise angular alignment. Furthermore, Wu discloses the arrangement of the LEDs in the form of letters or other patterns that can replace incandescent, neon, etc., lights that consume much more power. Wu states that the objective of the invention disclosed therein is easily installable LED modules that are usable in channel letter and commercial designs of any size and with basically any light intensity⁸. There is no teaching or suggestion of using a particular angular orientation (e.g., 120°) to form a homogeneous light beam, as now specified by amended Claim 36. Combining Wu with Parvelescu and Stuart might produce a multiple-LED light source. However, it would not be obvious to orient the LEDs at 120° nor would there be any obvious way to ensure

⁸emphasis added, Wu, col. 2, lines 7-13.

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precise angular alignment of the LEDs. Thus, for all of these reasons, Applicants respectfully submit that Claims 36-37 are now patentable over the art of record and respectfully request that the §103(a) rejection be withdrawn.

The Examiner has rejected Claim 42 also under 35 U.S.C. §103(a) as being unpatentable over Rose as applied to Claim 32 above and further in view of American Society for Testing and Materials D 6216-98: Standard Practice for Opacity Monitor Manufacturers to Certify Conformance with Design and Performance Specifications (ASTM D6216-98). In particular, the Examiner states that:

With regard to claim 42, Rose is silent as to whether the specific performance requirements of the opacity monitor of claim 32 comprise all of the requirements of ASTM D6216-98. It is noted that the additional performance requirements set forth in the claim fall within the requirements set forth in ASTM D6216-98. It would have been obvious to one having ordinary skill in the art to manufacture the opacity monitor of Rose such that it conforms to the specific performance requirements set forth in ASTM D6216-98 in order to render the opacity monitor more sellable.

Applicants respectfully disagree for the following reasons.

Claim 42 is dependent upon Claim 32 and is patentable for the same reasons. As mentioned earlier, the device of Rose is not an opacity meter and actually teaches away from the operation of the present invention. Thus, it is questionable whether the requirements of ASTM D6216-98 even apply to the Rose device. As a result, the Examiner's conclusion that it would have been obvious to one skilled in the art to manufacture the monitor of Rose to meet the requirements of ASTM D6216-98 fails to appreciate this distinction. Secondly, as stated on page 12, line 24 to page 13, line

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28 of the present application, not only does the present invention comply with the requirements of ASTM D6216-98 but it also complies with the new proposed requirements, namely, §§6.4-6.6, 6.8, 6.12, 7.8, 7.9 and 7.11, as specified on page 13 of the present application. Therefore, not only is Rose silent about compliance with ASTM D6216-98, but even moreso, the Rose device cannot be compliant with the new proposed requirements of ASTM D6216-98, if ASTM D6216-98 is not applicable to the Rose device. Thus, for all of these reasons, Applicants respectfully submit that Claim 42 is patentable over the art of record and respectfully request that the §103(a) rejection be withdrawn.

Claims 38-41 are ultimately dependent upon Claim 32 and are patentable for the same reasons.

For at least the reasons set forth above, it is respectfully submitted that the above-identified application is in condition for allowance. Favorable reconsideration and prompt allowance of the claims are respectfully requested.

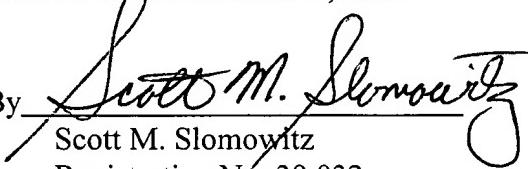
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Should the Examiner believe that anything further is desirable in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below.

Respectfully submitted,

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